CHARACTERIZATION OF RESISTANCE CONFERRED BY THE *N* GENE TO *MELOIDOGYNE ARENARIA*, *M. HAPLA*, AND *M. JAVANICA* IN 'CHARLESTON BELLE' AND 'CAROLINA WONDER' BELL PEPPERS

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Four species of root-knot nematodes (*Meloidogyne incognita, M. javanica, M. arenaria, and M. hapla*) are major pests in bell pepper (*Capsicum annuum*) growing areas of the United States. Pre-plant soil fumigation with methyl bromide is currently the primary control method for root-knot nematodes in bell pepper, but the proposed cessation of importation and production of this fumigant in the United States on 1 January 2001 has focused significant interest on host plant resistance. Recently, 'Charleston Belle' and 'Carolina Wonder', the first bell pepper cultivars with resistance to the southern root-knot nematode (*M. incognita*), were developed and released by scientists at the U.S. Vegetable Laboratory, USDA, ARS, Charleston, S.C. These cultivars provide an alternative to pre-plant fumigation of soil with methyl bromide for managing the southern root-knot nematode. However, the reactions of these resistant cultivars to the other major species of root-knot nematodes are unknown. We characterized two sets of isogenic pepper lines(isogenic at the *N* root-knot nematode resistance locus) for reaction to *M. arenaria* races 1 and 2, *M. hapla*, and *M. javanica* in greenhouse and growth chamber tests. The isogenic sets of *C. annuum* were 'Charleston Belle' (*NN*) and its recurrent parent 'Keystone Resistant Giant' (*nn),* and 'Carolina Wonder' (*NN*) and its recurrent parent 'Yolo Wonder B' (*nn)*. *Meloidogyne arenaria* race 1 was pathogenic to *C. annuum*. 'Charleston Belle' and 'Carolina Wonder' exhibited high resistance to *M. arenaria* race 1, and their respective recurrent backcross parents ;Keystone Resistant Giant' and 'Yolo Wonder B' were susceptible. *Meloidogyne arenaria* race 2 and *M. javanica* were not highly pathogenic to pepper. However, 'Charleston Belle' and 'Carolina Wonder' both exhibited higher ($P \leq 0.05$) resistance to *M. arenaria* race 2 and *M. javanica* than 'Keystone Resistant Giant' and 'Yolo Wonder B'. *Meloidogyne hapla* was pathogenic to pepper. Both 'Charleston Belle' and 'Carolina Wonder' and their respective recurrent parents 'Keystone Resistant Giant' and 'Yolo Wonder B' were susceptible to *M. hapla*. We conclude that the N gene, which conditions resistance to *M. incognita*, also conditions resistance to *M. arenaria* races

1and 2 and *M. javanica*, but not to *M. hapla*. Information on this resistance in pepper is important for making varietal recommendations, for designing cropping systems to manage root-knot nematodes, and in setting future priorities for pepper breeding programs. Planting cultivars with the *N* root-knot nematode resistance factor should provide a suitable alternative to pre-plant fumigation with methyl bromide for managing *M. arenaria* races 1 and 2, *M. incognita*, and *M. javanica*, but not *M. hapla*, in bell pepper.